Neven Ivandić
Institute for Tourism, Zagreb, Croatia
E-mail: neven.ivandic@iztzg.hr

ACCOMMODATION AND FOOD SERVICES SUPPLY CHAINS: AN INPUT-OUTPUT METHODOLOGICAL FRAMEWORK

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Abstract

The ratio of direct tourism gross value added to internal tourism consumption varies substantially from country to country. The paper aims to analyze these differences stemming from the variation and structure of their supply chains. The analysis is based on a comparative analysis of the input-output tables of France, Italy, Spain and Croatia in 2005, 2010 and 2015 published by the OECD. The analysis is performed in three steps. In the first step, an analysis based on a technical coefficient matrix is made of the structure of accommodation and food service industries supply chains in four Mediterranean countries. The second step includes the calculation of the industry's direct import dependence. The third step compares the effects of backward linkages of inputs. Results provide an insight into the factors that determine the different abilities of economies to generate added value and indicate the possibility of increasing the added value of tourism without increasing its physical volume.

Keywords: Accommodation and food services, input-output tables, supply chain

1. INTRODUCTION

The continued global growth in the tourist activity during the last two decades has only occasionally been interrupted as a result of security, economic or public health crises. The volume of arrivals from other parts of the world in Europe, the most important world tourist destination, has almost doubled between 2000 and 2019. The most rapid growth came in southern Europe and the Mediterranean, the biggest tourist region of Europe, in which international arrivals went up by 129% (World Tourism Organisation [WTO], 2012; WTO, 2020).

In the year 2019 the tourist and travel sector generated, directly, indirectly and induced, 10.3% of world GDP (WTTC, 2021). Tourism is an important economic activity even for the developed part of the EU, to which it contributes economic, social and cultural development and the enhancement of the general well-being of countries and regions (Eurostat, 2019). In addition to Germany, the state that in Europe has the biggest internal tourism consumption, the three biggest tourist states in Europe are France, Italy and Spain, countries located entirely or mainly in the south of Europe and the Mediterranean. But tourism, as a demand-side phenomenon (United Nations et al., 2010), in each of these countries is structured in a different way (Eurostat, 2019), regardless of whether these differences relate to the structure of internal tourism consumption or the ability to generate gross value added. The example of Croatia is no different. With a modest share in the

European tourism market and a high share of inbound tourism expenditure in tourism consumption (Croatian Bureau of Statistics, 2019), Croatia is characterized by great direct and indirect importance of tourism for the economy, which is estimated to have amounted to 16.9% of Croatian gross value added in 2016 (Ivandić, Šutalo, 2019).

The capacity to extract tourism gross value added from internal consumption, as a synthetic indicator of the effectiveness of tourism activities, is a reflection of numerous factors, including production structure, demand structure and the market position of tourism, as well as import dependence, the fiscal system and the structure of inputs and the technological efficiency of the economic agents. An important factor for generating gross value added is the supply chain as a set of activities involved in the development, production and delivery of products and services (Croxton, et al., 2001) that integrate a broad spectrum of activities including purchasing and supply management, and transportation and logistics management (Li et al., 2006).

The goal of the paper is to analyze the impacts of intermediate products on the generation of gross value added, analyzing a part of the supply chains in the ourism industry. This will improve our understanding of the role of supply chains in the production and delivery of products and services in tourism consumption.

The paper draws on numerous examples of the application of input-output analysis in measuring impacts and efficiency of tourism or tourism activities lasting more than 80 years (Fletcher, 1989). The use of input-output tables in Croatia also has a long tradition built on the works of scholars Branko Horvat, Mijo Sekulić and Mate Babić (Jurčić, 2000), while in the segment of analysis of multiplicative effects of tourism the works of Radnić (1990) and Jurčić (1998) should be singled out. In the research of tourism in Croatia, input-output analysis is still an important tool. For example, Ivandić and Šutalo in a recent paper from 2019 conclude that products of recreation, sports and culture and food and accommodation have the greatest potential for generating gross value added, but also that 'non-classic' tourism products have the greatest multiplicative effect on gross value added and that optimizing the effects of tourism implies developing domestic non-tourism economic activities.

The paper is focused on the accommodation and food service industry that generates an important part of internal tourism consumption, and is, accordingly, exceptionally important for the generation of the gross added value of tourism. In 2016 in Spain, for example, services of the accommodation services for visitors and the food- and beverage-serving services industries accounted for 51.4% of internal tourism consumption (Instituto Nacional de Estadistica, 2019) while in Croatia the corresponding figure is 38.2% (Croatian Bureau of Statistics, 2019).

Taking into consideration the constraint related to the heterogeneity of production of the individual activities as against the structure of delivered goods and services (Mikulić, 2018), the analysis is founded on the methodological framework of input-output analysis, and conducts a comparative analysis of the input-output tables of Spain, Italy, France and Croatia in 2005, 2010 and 2015 as published by the OECD. The point of departure of the analysis consists of the columns of the matrix of technological coefficients that offer an insight into the characteristics of the techniques used in the production of products of the activity as synoptic depiction of the relative relations of input prices and characteristics of the supply chain of the industry. The proportion of given inputs of import origins is determined from the input-output tables, with separate domestic and import flows while the effect of the use of individual inputs on other parts of the economy is calculated from the Leontief inverse matrix.

The work is structured in six parts. After the introduction, in part two, a short review is given of the key components of the methodological framework of input-output analysis. An analysis is made in part three of the structure and changes in the use of the most important inputs of the accommodation and food services industry between 2005 and 2015, inclusive. In part four, the shares of imports in the most important input industries are compared. Part six is focused on the effects of backward linkages of accommodation and food services industry inputs. The sixth

and final chapter sums up the results of the analysis and provides an insight into the factors that determine the different abilities of economies to generate added value and indicates the possibility of increasing the added value of tourism without increasing its physical volume.

2. THE METHODOLOGICAL FRAMEWORK OF THE INPUT-OUTPUT TABLE

In this paper, the analysis is founded on the OECD database of harmonised national input-output tables, edition 2018, compiled by the *industry* × *industry* approach. For countries in the database, the following are elaborated: (i) input-output tables of total flows; (ii) input output tables of separate domestic and imported flows; (iii) a table of value added components and (iv) Leontief inverse matrices for total flows and domestic flows as well as (v) the calculation of the import content of exports as a percentage of exports.

As a statistical and analytical tool that integrates both macro and micro level of economic analysis (Jurčić, 2000), the input-output tables offer a broad set of data related to production activities in an economy, including, among other things, data on (Eurostat, 2021) the interdependences of industries, the structure of the costs of production of one product/industry and the value added generated in the production of one product/industry and flows of goods and services with the rest of the world.

The analysis uses matrices of inter-industrial flows of goods and services for France, Italy, Spain and Croatia in 2005, 2010 and 2015, with separate flows for goods and services produced domestically and those imported. The tables are in the 36x36 industry format and are expressed in current prices (USD million). The tables include accommodation and food services as a separate industry. The analysis additionally uses Leontief inverse matrices calculated from domestic flows.

Developed by Wassily Leontief in the first half of the 20th century, the input-output table is a statistical quantitative model that describes the structural relationship among various producers (Hara, 2009) based on two identities. The first identity is related to the equivalence of total supply and total use, which means, that the value of domestically produced goods and services at basic prices and imported goods and services (total supply) is equal to the sum of the value of intermediate consumption, final consumption, gross capital formation and export. The second identity determines the equivalence of total output and total input, in other words, the equivalence of the value of the output at basic prices and the value of the intermediate inputs at purchasers' prices and gross value added at basic prices (United Nations, 2018).

With the assumption of a linear and fixed coefficient production function, an input-output table integrates data about the output of industries, which are shown in rows and the inputs of these industries, shown in columns (Hara, 2008; Mikulić, Lovrinčević, 2018). So, the core part of the input-output table is the transaction matrix. Each industry is recorded twice, as a user of inputs and as a producer of outputs. Columns in the transaction matrix represent the production techniques of the individual industries.

The input-output analysis starts with the calculation of input-output coefficients. For intermediate consumption of domestic products by production activities, the input coefficients of an industry *j* are defined as (United Nations, 2018):

$$a_{ij}^{D} = x_{ij}^{D}/x_j \tag{1}$$

where:

- a_{ij}^{D} = input coefficient for domestic products
- x_{ij}^{D} = value of the domestic product of industry i used by industry j
- x_j = value output of industry j

Input-output coefficients for imported intermediates are defined as:

$$a_{ij}^{U} = x_{ij}^{U}/x_j \quad (2)$$

where:

- a_{ij}^{U} = the input coefficient for imported products
- xij^{U} = the value of the imported product of industry i used by industry j
- xj = the value output of industry j

In matrix terms, the basic input-output model is:

$$\mathbf{X = A\,X + Y} \quad (3)$$

where:

- X= the vector of outputs in basic prices,
- A= the input coefficient matrix for intermediate consumption
- Y= the vector of final demand.

It is possible to transform the basic model into one with separate domestic and import flows (United Nations, 1999; Ivandić, Šutalo 2018):

$$\mathbf{X = A^{d}X + Y^{d} + (M^{id}X + Y^{m}\text{-}M)} \quad (4)$$

where*:*

- A^{d} = the coefficient matrix of domestically produced intermediate consumption
- M^{id} = the coefficient matrix of imported intermediate consumption
- Y^{d} = the vector of domestically produced final demand products
- Y^{m} = the vector of imported final demand products
- M = the vector of all (intermediate and final demand) imported products.

In equation 4 the expression $\mathbf{(M^{id}X + Y^{m}\text{-}M)}$ is equal to 0, from which is derived:

$$\mathbf{X = A^{d}X + Y^{d}} \quad (5)$$

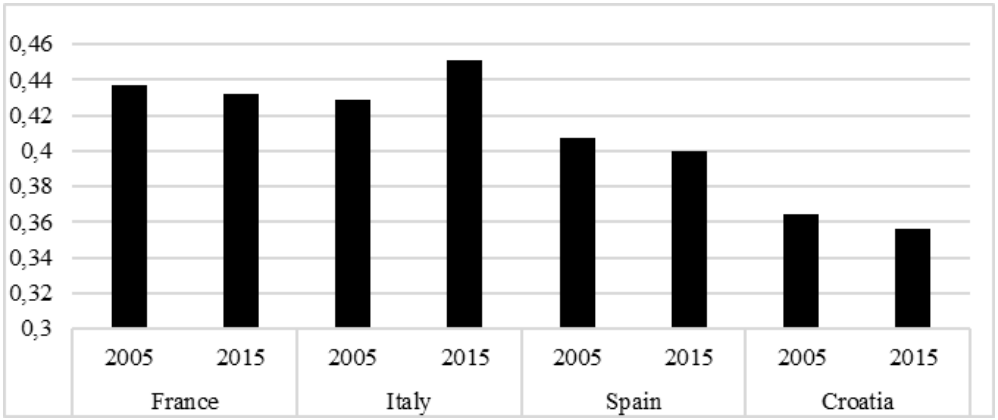
or

$$\mathbf{X} = (\mathbf{I} - \mathbf{A^{d}})^{-1}\,\mathbf{Y^{d}} \quad (6)$$

In equation 6, the expression $(I - A^{d})^{-1}$ is the matrix multiplier in which each element shows how much of the gross output in the industry *i* is generated by the final domestic delivery of industry *j*. The sum of column *j* elements in the matrix $(I - A^{D})^{-1}$ is the output multiplier that indicates the total value of production in all industries of the economy needed for the production of one unit of industry *j* product for final use (United Nations, 2018). The output multiplier combines direct and indirect impacts where direct impact is standardized at the initial impact of 1, while residual value measures indirect impacts (Hara, 2008).

3. STRUCTURE OF THE INTERMEDIATE CONSUMPTION OF THE ACCOMMODATION AND FOOD SERVICES INDUSTRY

Intermediate consumption measures the value of the goods and services used as inputs in the production process; it includes non-durable goods and services and excludes fixed assets. According to data from the OECD Input-Output Tables, 2018 edition, the intermediate consumption of the accommodation and food services industry is relatively the smallest in Croatia. In addition, it had the greatest proportion of value added in output, which is a consequence of the relatively simple products offered, such as camps, accommodation in families and rather unelaborated services of restaurants and bars (Marušić et al., 2020).



Source: Author, after data in OECD Input-Output Tables 2018 edition, https://stats.oecd.org/Index.aspx?DataSetCode=IOTSI4_2018

Figure 1 Technical coefficients of intermediate consumption of the accommodation and food service industries in France, Italy, Spain and Croatia in 2005 and 2015

In 2015, the share of intermediate consumption in the output of the activity in Croatia was 35.6%, and, reflecting the improvement in the efficiency of operations was 2.3% lower than in 2005. The structures and production techniques of the accommodation and food service industries in France and Italy generate a fairly similar share of intermediate consumption in outputs, which ranged from 43% in France to 45% in Italy, which, after a 5.3% growth of the share in 2015, was the highest share of intermediate consumption in all the countries being analysed (Figure 1).

The most important inputs of the accommodation and food services industry are the products of the food, beverages and tobacco industry, and if to them we add the products of the agriculture, forestry and fishing industry, it follows that inputs primarily related to food and drink made up between 36 and 48% of intermediate consumption in 2015, the most in Spain and the least in Croatia (Figure 2). In the period from 2005 to 2015 the proportion of these costs in all the countries in the analysis fell, except in Croatia: in France by 6.2%, Italy by 2.6%, and Spain by 0.5%, while in Croatia it rose by 8.4%.

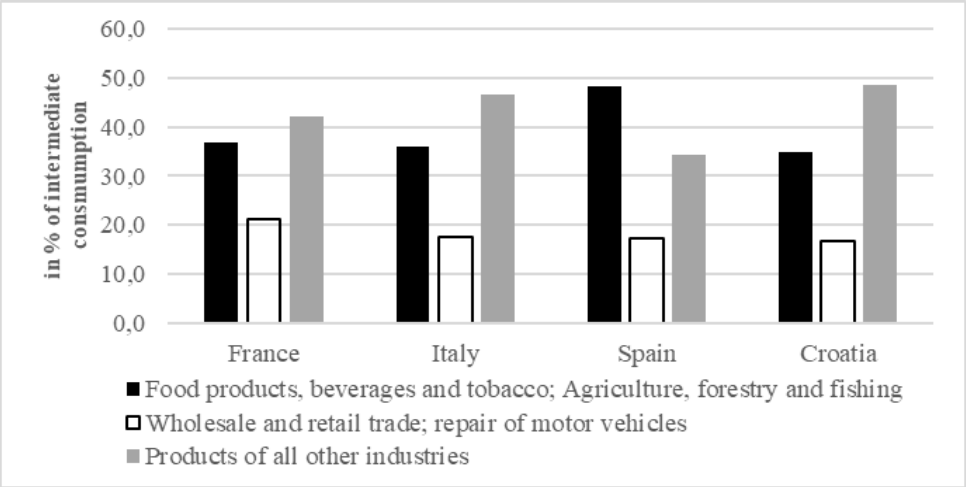


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Figure 2 The most important goods and services subcategories in the structure of the intermediate consumption of the accommodation and food service industry in France, Italy, Spain and Croatia in 2015, in %

Expenditure for the products and services of the food products, beverages and tobacco and the agriculture, forestry and fishing industries, along with the products and services of the wholesale and retail trade; repair of motor vehicles, are a key reason for the lower level of the share of intermediate consumption in production in Croatia. When these input groups are excluded from intermediate consumption, Croatia loses its advantage related to intermediate consumption. The share of other intermediate consumption in Croatia in 2015 is then 27% greater than in Spain and just 5.3% smaller than in France, 17.9% smaller than in Italy. It still remains to be investigated how the lower share of the costs of food and drink inputs, as well as those of the services of wholesale and retail trade are reflected in the quality of the final products of the industry and its competitiveness.

In Croatia the accommodation and food service industry is inefficient in terms of energy and other communal infrastructure costs (OECD, 2018). In 2015 in Croatia, 15% of intermediate consumption went on services of the electricity, gas, water supply, sewerage, waste and remediation services industry and the mining and extraction of energy producing products industry, while the corresponding figures were 4.9%, 5.3% and 6.0% for France, Spain and Italy respectively. In a similar way, economic agents in Croatia have to spend more for products and services of the following industries: financial and insurance activities; arts, entertainment, recreation and other service activities; chemicals and pharmaceutical products; and human health and social work.

The structure of inputs in the accommodation and food service industry in Croatia was unchanged in the 2005 to 2015 period (OECD, 2018). The share of the two most important inputs, the products and services of the food products, beverages and tobacco industry, went from 21.2% to 28.9%; the share of products and services of the wholesale and retail trade; repair of motor vehicles rose from 16.0 to 16.8%. On the other hand, the share of electricity, gas, water supply, sewerage, waste and remediation services was reduced by 11.5%, that of agriculture forestry and fishing by 41.9%, of mining and extraction of energy producing products by 23.1% and of transportation and storage by 23.8%.

4. IMPORT DEPENDENCE OF INTERMEDIATE CONSUMPTION OF THE ACCOMMODATION AND FOOD SERVICES INDUSTRY

Croatian accommodation and food services industry is most dependent on imports; in the period from 2005 to 2015, the import dependency of this industry actually increased. In 2005 19.4% of inputs were of imported origin, and by 2015 this figure had climbed to 21% (Figure 3). These findings confirm the results of previous research that, on the basis of a hotel company survey, showed that the orientation of economic agents to imports derived from the restricted availability of domestic goods and services as well as lower prices of imported goods and services (Ivandić, Marušić, 2007). The import dependence of the industry in Croatia was twice as great as in Spain and Italy and 60% higher than in France. In all four countries, the share of imports in intermediate consumption increased in the 2005 to 2015 period.

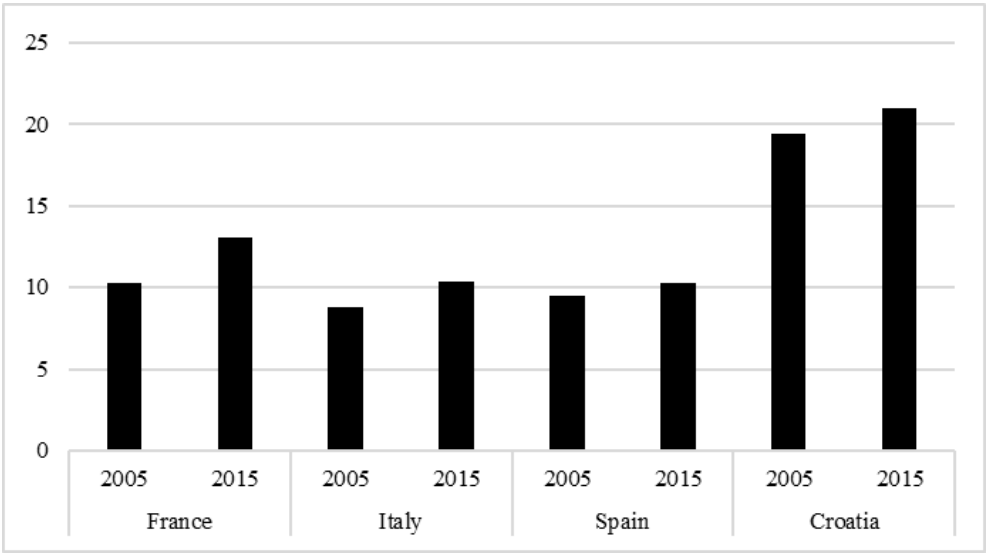

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Figure 3 Share of the value of imported goods and services in the intermediate consumption of the accommodation and food services industry in France, Italy, Spain and Croatia in 2005 and 2015, in %

The import dependence of the accommodation and food services industry in Croatia is characterised by the high proportion of imports in all the important input groups, reflecting Croatia's dependence, as a small and open economy, on the import of intermediate inputs (Mikulić, Lovrinčević, 2018). The proportion of imports in the intermediate consumption of goods and services in the food products, beverages and tobacco industry in 2015 was 27.1%, unlike for example Spain, where it was 10.5%, Italy, 13.2% and France 18.2%.

The share of the imports of all the major inputs of the accommodation and food services industry went up in Croatia in the 2005 to 2015. The high share of imports and their further growth has a potentially negative effect on the growth of the quality and competitiveness of Croatian tourism due to risen level of the internationalisation of production (Egger, Egger, 2003) and the greater orientation to less specific import products (Ivandić, Marušić, 2007). This might generate the loss of the possibility of differentiating products, a key driver of success in the market structure of monopolistic competition, particularly in the gastronomy segment, which is important for tourists (World Tourism Organization, Basque Culinary Centre, 2019). The share of imported products and services of the food products, beverages and tobacco industry had by 2015 increased to 27.1% in 2015 from the 19.00% of 2005, while in the same period the share of imported products of the agriculture, forestry and fishing industry went up from 10.3% to 17.3%. Also increased were imports of products and services from the wholesale and retail trade; repair of motor vehicles industry, and goods and services of the electricity, gas, water supply, sewerage, waste and remediation services industry (OECD, 2018).

5. MULTIPLICATIVE EFFECTS OF INTERMEDIATE CONSUMPTION OF THE ACCOMMODATION AND FOOD SERVICES INDUSTRY

In the four countries, the indirect multiplicative effects of the accommodation and food services industry are the smallest in Croatia as a result of the lower share of intermediate consumption, greater import dependency and, as to be expected, weak intersectoral connectedness of Croatian producers. On the other hand, the industry contributes the most to the overall economy in Italy,

even though in all the three highly developed tourist countries the impacts of the industry ranged at more or less the same level.

From 2005 to 2015 the range of multiplicative effects of the industry established based on the domestic intermediate flows ranged from 1.68 in France in 2015 to 1.77 in Italy in 2010. In Croatia in 2015 the sum of elements of the accommodation and food services column from the matrix multiplier derived from domestic intermediate flows, as an indicator of the multiplicative effect of the industry, was 1.47, in other words, 14.0% lower than the average of the other countries analysed (Figure 4).

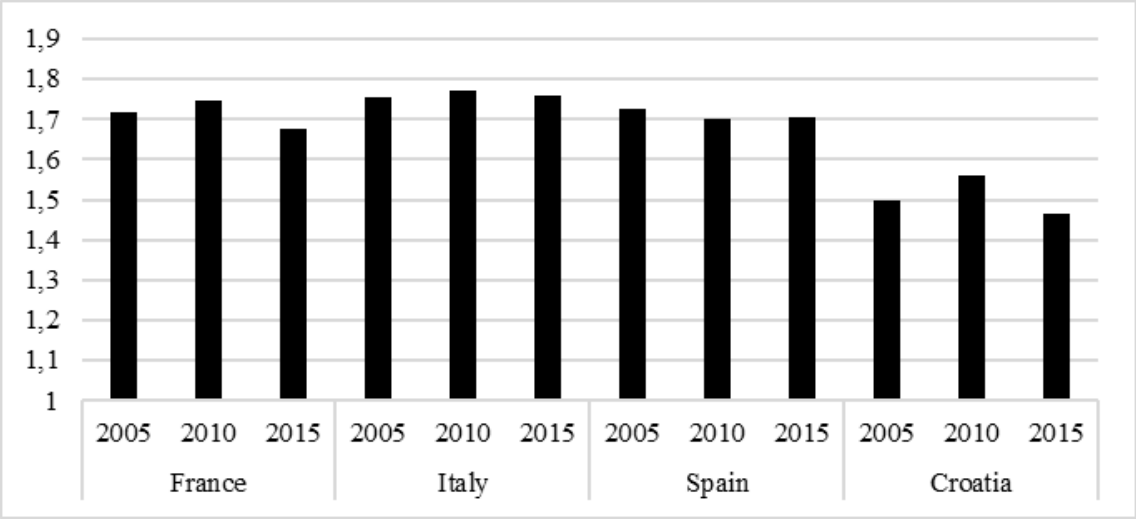

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Figure 4 Sum of elements of the accommodation and food services column from the matrix multiplier derived from domestic intermediate flows (I - Ad)-1 of France, Italy, Spain and Croatia in 2005, 2010, 2015

The multiplicative effect of the most important inputs, in particular food products, beverage and tobacco and wholesale and retail trade; repair of motor vehicles in Croatia lags behind that of other countries (OECD, 2018). For example, the use of products and services of the food, beverages and tobacco industry in Croatia contributes only 38% as much as the same industry generates in Spain, and 54% of the Italian and 63% of the corresponding French figures. The contribution made by wholesale and retail trade; repair of motor vehicles in Croatia is also a third less than in the other countries under analysis.

6. CONCLUSIONS

To a significant extent, Croatian tourism is focused on the inappropriate and non-renewable natural resources rent-extraction business model. This implies the existence of externalities founded in the different production and consumption relationships (Tribe, 2004) and then, inevitably, market failures. The question arises then of the possibility of transforming the existing developmental model that rests on the quality of natural resources to a development model that is founded, in all the segments of the tourist activity, on human capital, management and organisation (Ivandić et al., 2019).

The analysis in this paper, which aimed to determine the impacts of the use of intermediate products on the generation of gross value added, has shown that Croatia has managed to generate an above-average share of value added in value of production of the accommodation and food

services industry relatively to the other four countries. But in the context of the seasonal orientation of tourism in Croatia which has a simpler product structure and relies more on the use of natural assets (Ivandić et al., 2015), that efficiency has its drawbacks. As compared with the structure of inputs in the other countries analysed, Croatia spends little for the important products and services such as food, beverage and tobacco and also the agriculture, forestry and fishing industry, while at the same time the expenditures on numerous other inputs in Croatia are, relatively, much greater. Similarly, the share of imports in the inputs of the industry is much larger in Croatia. In spite of the price advantage that comes with importing, the question arises as to how much this business orientation contributes to a potential loss of product differentiation, and then to a long-term loss of competitive ability. The industry generates a crucially weaker multiplicative effect on the economy of Croatia, losing the possibility of tourism having greater positive effects on the economy.

The analysis conducted in this paper is faced with numerous constraints. Apart from the lack of the possibility of any deeper consideration of the relations of the production and supply chain techniques used in the accommodation and food services industry in the different states, important limitations are related to the characteristics of an input-output analysis. Input-output tables depend on the assumption that the inputs used in producing a product are related to the industry output by a linear and fixed coefficient production function that measures only positive effects (United Nations, 1999; Blake, 2009). Other important methodological issues derive from the restrictions related to the accessibility of sources of information, the assumed homogeneity of the production of individual industries in relation to the structure of inputs and outputs and differences in the concepts of assessing supply and demand (Mikulić, 2018).

Notwithstanding the methodological restrictions, the analysis can provide an insight into the factors that determine the different abilities of economies to generate added value and can indicate the possibility of increasing the added value of tourism without increasing its physical volume.

Apart from raising the average daily consumption of tourists, which in the international environment means raising the level of differentiation and enlarging the diversity, and increasing the quality of the supply, the results draw attention to advances needing to be made in the segment of the 'production' of tourist services. Analysis indicates the need to comprehend both the ability of the supply to meet the expectations of contemporary tourism and the justification of the orientation to imports. This is a needful point of economic policy that should enable the strengthening of tourism in Croatia via the creation of an institutional framework to improve the capabilities of all activities and economic agents directly or indirectly involved in tourism activities. Not only will this additionally ensure their strengthening in international market competition, but it will enable the growth of earnings and the value of production based on the growth of the physical volume of tourism and the exploitation of natural and cultural resources to be replaced by the long-term sustainable development of tourism. This is a process that presupposes upgrading of the supply chain of tourism, the adjustment and strengthening of production to the needs of tourism activities, and insistence on the creation of a complex tourist product, one that is recognisable in the market and that has a high added value and not only a high share of added value in the value of production.

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